show an amount of knowledge equivalent to that which in Classics or Mathematics usually gains an Exhibition or Scholarship in the College.

King's College.—On Wednesday, April 4, 1877, and following days an Exhibition in Natural Science will be offered for competition. The Exhibition is worth about 90*l.* a year, and is tenable for three years, but not with any other Exhibition or Scholarship of the College.

Christ's College.—One or more in value from 30*l.* to 70*l.*, according to the number and merits of the candidates, tenable for three-and-a-half years, and for three years longer by those who reside during that period at the College.

Gonville and Caius College.—One of the value of 60*l.* per annum. The examination begins on the last Tuesday in the Lent term. College examinations are held annually in the Easter term for Medical and Natural Science Students who have passed the University previous examination, in Anatomy, Physiology, Physics, Chemistry, &c., at which prizes and Scholarships of the value of from 60*l.* to 20*l.* are awarded to members of the College of the first, second, and third year, on precisely the same conditions as those for other branches of learning. Examinations are also held, as vacancies occur, in Botany and Comparative Anatomy in its most general sense (including Zootomy and Comparative Physiology), for two Shuttleworth Scholarships, each of the value of 60*l.* per annum, and tenable for three years. The successful candidates for the Tancred Medical Studentships are required to enter at this College; these studentships are five in number, and the annual value of each is 100*l.* Information respecting these may be obtained from B. J. L. Frere, Esq., 28, Lincoln's Inn Fields, London.

Clare College.—One of the value of 60*l.* per annum, tenable for two years at least. The examination will be held on March 20.

Downing College.—One or more of the value of 60*l.* per annum. The examination will be on or about April 9.

Sidney College.—One of the value of 60*l.* The examination will be on March 20.

Emmanuel College.—One Foundation Scholarship of 70*l.*, tenable till the holder is of standing for the degree of B.A., and four Minor Scholarships (two of 70*l.*, and two of 50*l.*), tenable for two years, will be awarded. The examination will take place on March 20.

Non-Collegiate Students.—An Exhibition each year is given by the Clothworkers' Company, value 50*l.* per annum, tenable for three years. Examination about Christmas, open to Non-Collegiate Students who have commenced residence in the October term, and to any who have not commenced residence. Information to be obtained from the Rev. R. B. Somerset, Cambridge.

The subjects, it may be stated generally, are Chemistry, Physics, Geology and Mineralogy, Botany, Comparative Anatomy and Zoology, and Physiology; but for detailed information application must be made to the tutors of the respective Colleges.

Although several subjects for examination are in each instance given, this is rather to afford the option of one or more to the candidates, than to induce them to present a superficial knowledge of several. Indeed, it is expressly stated by some of the Colleges that good clear knowledge of one or two subjects will be more esteemed than a general knowledge of several. In some instances, as at Caius College, each candidate is required to furnish beforehand a list of the subjects in which he desires to be examined.

There is no restriction on the ground of religious denominations in the case of these or any of the Scholarships or Exhibitions in the Colleges or in the University.

Some of the Colleges do not restrict themselves to the number of Scholarships here mentioned, but will give additional Scholarships if candidates of superior merits present themselves; and other Colleges than those here mentioned, though they do not offer Scholarships, are in the habit of rewarding deserving students of Natural Science.

It may be added that Trinity College will give a Fellowship for Natural Science, once, at least, in three years, and that such a Fellowship will be given in the present year. The examination will take place at the end of September, and will be open to all Bachelors of Arts, Law, and Medicine of the University, of not more than three years' standing from their first degree. Application should be made to the Rev. Coutts Trotter, Tutor of Trinity. Most of the Colleges are understood to be willing to award Fellowships for merit in Natural Science equivalent to that for which they are in the habit of giving them for Classics and Mathematics.

OUR ASTRONOMICAL COLUMN

THE COMET OF 1812.—In view of the approaching return of the comet discovered by Pons on July 20, 1812, which beyond doubt, at the time of its visibility, was moving in an elliptic orbit with a period of about seventy years, it is not without interest to inquire into the particular circumstances of its track in the heavens, and distance from the earth and sun, under different assumptions, with regard to the time of the next perihelion passage. The case is a very different one to that of Halley's comet (which has a period only five or six years longer than that of the comet in question) at its last appearance in 1835, or even at the previous one in 1759. The semi-axis major of Halley's comet was already known with considerable precision, from this body having been observed at several returns to perihelion since the year 1456, and in 1835 an exceedingly close prediction of the date of the comet's arrival at its least distance from the sun was made, it is true, after most laborious calculation. Pons' comet of 1812 is not thus situated. So far, no previous appearance has been recognised, and we are, therefore, dependent entirely upon the observations made in 1812 for the determination of the length of the revolution, and hence of the epoch of its next return. Within what limits these observations admit of the period being assigned, has not perhaps as yet been fully examined, but it appears probable they will be wider than in the case of another comet of similar length of revolution, that discovered by Olbers on March 6, 1815, the perturbations of which were calculated for the present revolution by Bessel, who fixes the return to February, 1887, though the prediction may be materially in error.

From the great inclination of the orbit of Pons' comet to the plane of the earth's annual path, it is perhaps possible that with a fairly accurate prediction of its position, it might be detected with very powerful telescopes, no matter at what time of the year the perihelion passage falls, but such prediction being impracticable, it is desirable, as we have already remarked, to trace out the apparent path of the comet amongst the stars, on different hypotheses as to date of arrival at perihelion. At present we shall confine our remarks to the more favourable conditions under which it is possible for the comet to appear.

The nearest approach of the comet's orbit to that of the earth (0·185) occurs near the passage of the descending node, about 9$\frac{3}{4}$ days before the arrival at perihelion, and the longitude of the descending node being in 73° 56′ for 1880, we may assume the perihelion passage to take place on December 15·0. In this case the comet would have the following track :—

	R.A.	N.P.D.	Distance from earth.
	°	°	
Nov. 5 ...	223·8 ...	32·9 ...	0·787
,, 15 ...	228·4 ...	38·3 ...	0·551
,, 25 ...	236·3 ...	52·7 ...	0·316
Dec. 5 ...	252·5 ...	110·1 ...	0·185
,, 15 ...	283·0 ...	157·0 ...	0·356
,, 25 ...	311·4 ...	164·8 ...	0·629

If the perihelion passage be taken eight days later, when the earth and comet would have about the same heliocentric longitude, with the latter body in perihelion, we shall have :—

	R.A.	N.P.D.	Distance from earth.
	°	°	
Oct. 24 ...	231·3 ...	29·6 ...	1·181
Nov. 13 ...	241·8 ...	34·7 ...	0·760
,, 23 ...	251·4 ...	40·1 ...	0·529
Dec. 3 ...	267·8 ...	56·4 ...	0·308
,, 13 ...	293·9 ...	110·7 ...	0·223
,, 23 ...	320·9 ...	146·2 ...	0·396
Jan. 2 ...	336·9 ...	155·8 ...	0·656

Under such conditions it appears very improbable that the comet could escape observation. At its discovery in 1812 it was a diffused telescopic nebulosity, but towards the end of August it became visible to the unaided eye, and about the time of

nearest approach to the earth in the middle of September it exhibited a tail 2¼° in length, according to Baron de Zach; at this period, though near perihelion, its distance from the earth was 1·26. We may conclude that should the comet arrive at its least distance from the sun about the close of the year, its recovery will be almost certain.

In a future note we shall examine the conditions attending perihelion passage at other seasons.

The appearance immediately preceding that of 1812 probably occurred about the year 1742. The calculated comet of that year had very different elements, and the same remark applies to the two comets of 1743. Struyck mentions a second comet in 1742, recorded in the journals of several Dutch navigators. On the morning of April 14, the ship being (at noon) in latitude 35° 36′ S., and longitude 42° E., the comet was in the E. ¼ S.E., with a tail 30° in length; the time is not given. From this rough indication it may perhaps be inferred that its place was somewhere amongst the stars of Pisces, or bordering ones in Aries; in too small a right ascension to admit of its identity with the comet of 1812. And as already stated, an examination of earlier cometary records is not attended with more success.

During the actual revolution there may be very sensible perturbations due to the attraction of the planet Uranus.

THE ZODIACAL LIGHT.—This phenomenon was conspicuous in the neighbourhood of London on the evening of the 4th inst. At 6h. 35m. the light was very much stronger than that of the Via Lactea in the brightest part above the horizon, and totally different in colour, being a pale yellow in the more elevated portion, with a ruddy tinge nearer the horizon. It was not distinctly traceable much beyond ζ Piscium; the axis of the light passed through about R.A. 352°, N.P.D. 100°.

BIOLOGICAL NOTES

AMOUNT OF WATER IN TREES.—Farmers and gardeners have often observed, and the fact is referred to by Lindley, that during cold weather the branches of certain trees are sometimes so much bent down as to obstruct passage below the tree, but that with the advent of mild weather they return to their former positions. In investigating these phenomena, Prof. Geleznow observed that they depend not only upon temperature, but also upon the humidity of the air; and he undertook, therefore, a series of researches to ascertain the amount of water contained in different parts of the branches under various atmospheric conditions. The first part of these researches (not yet published) proved (1) that the amount of water increases in each branch from its base to its summit; (2) that the bark of the larch throughout the year contains more water than the wood; and (3) that in Coniferæ the upper part, *i.e.*, the part above the pith of a horizontal branch, contains always more water than the lower part, whilst in other trees, as, for instance, the birch, the conditions are reversed; altogether, that Coniferæ and Dicotyledones seem to possess opposite properties, as regards the distribution of water in the tree. Further researches, published now in full (*Bull. Ac. de St Pétersb.*, vol. xxii., No. 3), introduced new elements into the inquiry, namely, the varying amount of water in the bark and the wood. It appears from these researches that humidity of the wood and dryness of bark have a constant relation; that in certain trees (fir and maple) the wood remains throughout the year drier than the bark, while in others (birch and aspen) this is the case only during a part of the year, the conditions being reversed at other times. The relations between the humidity of the bark and that of the wood are so constant, that a useful classification could be based on them. It appears, further, that the smallest amount of water contained by the branches of certain trees, as, for instance, the fir, is observed during the season when the vegetation is in fullest vigour, and that this circumstance, as well as some other important facts, is in close relation with the development of leaves. Altogether the researches, which are yet far from being completed, promise to disclose, and probably explain, a variety of very interesting facts.

THE EEL.—In the last session of the Rhenish and Westphalian Natural History Society, O. Melsheimer reported the results of observations on the habits of the eel, conducted through a series of years. The statement that the eel subsists on vegetable nourishment, probably originating from Albertus Magnus, is shown to be utterly false. Examinations of the contents of the stomach of numerous individuals show that the food of the eel is exclusively animal. It seems to be especially fond of the river lamprey (*Petromyzon fluviatilis*). The periodical movements—down stream in August and September, and up stream in April—are brought in connection with the spawning, which takes place in the sea. The bluish-black and the yellowish-green varieties are perfectly alike in their habits.

HONEYDEW IN PLANTS.—Prof. Dr. H. Hoffmann, of Giessen, has recently published the results of his observations on the formation of honeydew upon the leaves of plants, and has come to the conclusion that it is not to be attributed to the *Aphis*, or other insects. A healthy specimen of *Camellia japonica*, 1½ feet in height, without blossoms, which afforded an instance of the phenomenon, was found to be entirely free from insects. The so-called honeydew consisted of a sticky colourless liquid, which possessed a sweetish taste, and contained, principally, gum. This gradually appeared on the surface of the leaves, slowly forming drops on the under-side, which dropped down to be continually replaced. The separation of the liquid continued vigorously for some time, even after the removal of the leaves from the plant. Although showing that the appearance of the dew is not attributable to insects, Prof. Hoffmann was unable to ascertain the real method of formation. On the upper side he was able to trace the origin of spots of a clear slightly sweet liquid on the leaves of an ivy, to the presence of *Coccus sp.* This insect, as well as *Coccus abietis* and *pini*, seems to possess the power of forcibly ejecting, *per anum*, a sweetish secretion, which causes them to be sought after by bees.

RELATION OF BODY-CHANGE TO TEMPERATURE.—From exact experiments on frogs (measuring the consumption of oxygen and production of carbonic acid at different temperatures), M. Schulz arrives at the conclusion that the exchange of materials in these animals is directly dependent on the temperature (Pflüger's *Archiv*). It is specially notable, in M. Schulz's tables, that at 1° body-temperature the frog exhales so little carbonic acid that it was hardly certain whether it produced any (the amount was 0·0084 gr. per kilo. and hour). At 33° to 35°, on the other hand, the frog shows an exchange of material which comes up to that of man, and at 37° it would probably exceed this considerably, if the organism of the cold-blooded animal permitted of so rapid a replacement as the strong consumption would require. The upper limit of temperature for the frog is therefore somewhere about 35° C.

NOTES

THE city of Brunswick is making preparations to celebrate the 100th birthday of Carl Friedrich Gauss, the mathematician and astronomer, who was born there April 30, 1777. A statue is to be erected to Gauss, and it is hoped that the foundation stone will be laid on the celebration day. Contributions are requested by the Committee to be sent to the Brunswick Bank.